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09/700,951	11/21/2000	Mikko Huttunen	274039	4662

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EXAMINER	
PERILLA, JASON M	
ART UNIT	PAPER NUMBER
2634	9

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/700,951	HUTTUNEN, MIKKO	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on 08 April 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 11 November 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-8 are pending in the instant application.

Response to Arguments

2. Applicant's arguments received April 8, 2004 have been fully considered but they are not persuasive.

Regarding the Applicants arguments (pg. 6) in reference to the prior art rejections of claims 1, 3-5, and 7-8 as being unpatentable over Love et al (5363412) in view of Birchler et al (5440582) and claims 2 and 6 as being unpatentable over Love et al, in view of Birchler et al, and in further view of LaRosa (5323421), the arguments are not persuasive. The Applicant asserts that prior art rejections do not meet the claim limitations including using a predetermined threshold and recognizing an interfering signal. However, the Examiner affirms the position that a predetermined threshold is inherent or at least implied and obvious in view of the teachings of Birchler et al (col. 6, lines 19-22). Birchler et al teaches the use of a signal determination block to determine if a signal is usable. Hence, Birchler et al teaches that a threshold or noise level comparison is used by the signal usability determiner (fig. 2, ref. 209) to make a decision regarding how much interference is present among the wanted portion of the received signal. If too much interference is present, the signal may not be accepted (col. 6, lines 30-37). Therefore, the reception of the interfering signal is recognized (the signal is rejected by the signal usability determiner) if the error estimate is greater than a predetermined threshold. Regarding the Applicant's assertion that the prior art only discloses a noise signal and not an interfering signal, the Examiner notes that a noise

signal is an interfering signal. The Examiner also notes that the specification does not provide that the interfering signal is an interfering *communications or data* signal.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3-5, and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Love et al (5363412 – IDS Paper No. 5; Ref. BR) in view of Birchler et al (5440582).

Regarding claim 1, Love et al discloses a method of detecting an interfering signal in a time division multiple access (TDMA) radio receiver (fig. 2; col. 2, line 22), the method comprising: taking samples from symbol sequences of a received signal over a TDMA timeslot (col. 3, lines 10-18); generating by a modulation detector a signal path or signal value corresponding to the TDMA timeslot or a portion thereof (col. 3, lines 50-52); and determining an error estimate representing the erroneousness of the signal path generated (col. 3, lines 50-65). Love et al discloses a typical, almost notoriously known, receiver of a TDMA transmission. The method of the receiver is shown by figure 3. The signal path is determined by the Viterbi decoder (22), and the channel impulse response or error estimate is determined by the channel predictor and channel estimator (26 & 25, respectively). By this method of reception of the TDMA signal, a minimum least squared error or maximum likelihood sequence estimator

(MLSE) evaluation is used to make symbol decisions (col. 2, lines 9-17). Although the method described by Love et al discloses the generation of an error estimate representing the erroneous of the signal path (fig. 3, "ERROR SIGNAL"), it does not disclose comparing the error estimate representing the erroneous of the signal path with a predetermined threshold value, and recognizing the reception of the interfering signal if the error estimate is greater than the predetermined threshold value. However, Birchler et al teaches an analogous receiver method of TDMA signals (col. 3, lines 9-22). Birchler et al teaches that by the determination of signal usability, a receiver can appropriately provide feedback to a communications system for channel assignment and communications handoffs (col. 6, lines 30-38). The method taught by Birchler et al comprises making a determination of signal usability (col. 6, lines 19-22), and it is inherent in such a determination that a threshold or test of signal usability is utilized to make the determination. The reception of an interfering signal is analogous to the reception of a signal that is not usable. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to use the signal usability determination as taught by Birchler et al in the TDMA reception method disclosed by Love et al because the determination of signal usability would be advantageous to the system for the allocation of system channels and the determination of channels that are no longer serviceable by the system.

Regarding claim 3, Love et al in view of Birchler et al disclose the limitations of claim 1 as applied above. Further, Love et al discloses the method further comprising using a signal path error metric which is generated by means of quadratic errors which

are calculated on the basis of the difference between individual symbol sequence specific sample points and corresponding reference constellation points constructed on the basis of the channel estimate describing the state of the radio channel used as the error estimate representing the erroneousness of the signal path. An adaptive MLSE receiver makes a symbol decision based upon the quadratic errors between the signal path and the estimated channel error signal path (col. 3, lines 46-65). One skilled in the art is familiar with how an MLSE receiver works to make symbol decisions for quaternary phase shift keyed (QPSK) modulated signals. The channel error estimate is composed of a reference constellation of points (col. 3, line 66 – col. 4, line 5). As is understood by one of ordinary skill in the art, the channel error estimate comprises a type of weighted average by using the received complex signal values for tracking and describing the state of the radio channel.

Regarding claim 4, Love et al in view of Birchler et al disclose the limitations of claim 1 as applied above. Further, Love et al discloses the method further comprising generating two or more alternative signal paths (fig. 5, refs. 44, 45; col. 2, lines 10-15) from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), determining an error estimate of each signal path, and selecting the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Regarding claim 5, Love et al discloses equipment for detecting an interfering signal in a time division multiple access (TDMA) radio receiver (fig. 2; col. 2, line 22), the equipment comprising: means for taking samples from symbol sequences of a

received signal over a TDMA timeslot (col. 3, lines 10-18), a modulation detector for generating a signal path or signal value corresponding to the TDMA timeslot or a portion thereof (col. 3, lines 50-52), wherein the equipment is arranged to determine an error estimate representing the erroneousness of the signal path generated (col. 3, lines 50-65). Love et al discloses a typical, almost notoriously known, receiver of a TDMA transmission. The equipment of the receiver is shown by figure 3. The signal path is determined by the Viterbi decoder (22), and the channel impulse response or error estimate is determined by the channel predictor and channel estimator (26 & 25, respectively). By this receiver of the TDMA signal, a minimum least squared error or maximum likelihood sequence estimator (MLSE) evaluation is used to make symbol decisions (col. 2, lines 9-17). Although the method described by Love et al discloses the generation of an error estimate (fig. 3, "ERROR SIGNAL"), it does not disclose comparing the error estimate with a predetermined threshold value, and recognizing the reception of the interfering signal if the error estimate is greater than the predetermined threshold value. However, Birchler et al teaches an analogous receiver system of TDMA signals (col. 3, lines 9-22). Birchler et al teaches that by the determination of signal usability, a receiver can appropriately provide feedback to a communications system for channel assignment and communications handoffs (col. 6, lines 30-38). The system taught by Birchler et al comprises making a determination of signal usability (col. 6, lines 19-22), and it is inherent in such a determination that a threshold or test of signal usability is utilized to make the determination. The reception of an interfering signal is analogous to the reception of a signal that is not usable. Therefore, it would

have been obvious to one of ordinary skill in the art at the time which the invention was made to use the signal usability determination as taught by Birchler et al in the TDMA reception method disclosed by Love et al because the determination of signal usability would be advantageous to the system for the allocation of system channels and the determination of channels that are no longer serviceable by the system.

Regarding claim 7, Love et al in view of Birchler et al disclose the limitations of claim 5 as applied above. Further, Love et al disclose the equipment wherein a signal path error metric which is generated by means of quadratic errors which are calculated on the basis of the difference between individual symbol sequence specific sample points and corresponding reference constellation points constructed on the basis of the channel estimate describing the state of the radio channel is used as the error estimate representing the erroneousness of the signal path. An adaptive MLSE receiver makes a symbol decision based upon the quadratic errors between the signal path and the estimated channel error signal path (col. 3, lines 46-65). One skilled in the art is familiar with how an MLSE receiver works to make symbol decisions for quaternary phase shift keyed (QPSK) modulated signals. The channel error estimate is composed of a reference constellation of points (col. 3, line 66 – col. 4, line 5). As is understood by one of ordinary skill in the art, the channel error estimate comprises a type of weighted average by using the received complex signal values for tracking and describing the state of the radio channel.

Regarding claim 8, Love et al in view of Birchler et al disclose the limitations of claim 5 as applied above. Further, Love et al discloses equipment comprising two or

more parallel modulation detectors (fig. 5, refs. 44, 45; col. 2, lines 10-15) of different types for generating two or more alternative signal paths from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), the equipment being arranged to determine an error estimate of each signal path and to select the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

5. Claims 2-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Love et al in view of Birchler et al, and further in view of LaRosa et al (5323421 – IDS Paper No. 5; Ref. AR).

Regarding claim 2, Love et al in view of Birchler et al disclose the limitations of claim 1 as applied above. Love et al in view of Birchler et al do not disclose the method of claim 1 characterized by using in the comparison an error estimate of a signal path corresponding to a half timeslot. However, LaRosa et al teaches a TDMA receiver (col. 1, lines 24-27) method that performs a channel quality estimation or finds the channel error estimate (col. 1, lines 50-55). Further, LaRosa et al teaches that the accuracy of conventional channel error estimates is insufficient because of the limited number of bits within the estimation interval (col. 1, lines 37-47; lines 56-60) and teaches a method wherein the channel estimator uses all bits from entire sub-intervals in the estimate (col. 2, line 65 – col. 3, line 9). LaRosa teaches that by using only the bits of the "sync words", the channel error estimate can be insufficiently accurate (col. 1, lines 50-55). In view of the teachings of LaRosa et al, it is obvious that the best channel error estimate can be acquired by using as many bits as possible from the receiving signal(s) during

the error estimation. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to utilize as many bits as possible in the receiving signal for the estimation of the channel error as taught by LaRosa et al in the TDMA receiver method of Love et al in view of Birchler et al because the channel error estimate would be as accurate as possible. The applicant's explanation of the use of a "half timeslot" worth of bits in the channel error estimate on page 2, line 22 is made as "for example", and does not imply any particular novelty with the exact number (a half timeslot worth) of bits. It would have been obvious for one of ordinary skill in the art to use more bits from a TDMA frame for the channel error estimate than those only found in the synchronization word. For example, it would be obvious to one of ordinary skill in the art to use any number of bits between only the number of bits in the sync word to the total number of bits in the TDMA frame, including half the bits, as only limited by the cost and complexity of the receiver system.

Regarding claim 6, Love et al in view of Birchler et al disclose the limitations of claim 1 as applied above. Love et al in view of Birchler et al do not disclose the equipment of claim 1 characterized by using in the comparison an error estimate of a signal path corresponding to a half timeslot. However, LaRosa et al teaches a TDMA receiver (col. 1, lines 24-27) method that performs a channel quality estimation or finds the channel error estimate (col. 1, lines 50-55). Further, LaRosa et al teaches that the accuracy of conventional channel error estimates is insufficient because of the limited number of bits within the estimation interval (col. 1, lines 37-47; lines 56-60) and teaches a system wherein the channel estimator uses all bits from entire sub-intervals in

the estimate (col. 2, line 65 – col. 3, line 9). LaRosa teaches that by using only the bits of the "sync words", the channel error estimate can be insufficiently accurate (col. 1, lines 50-55). In view of the teachings of LaRosa et al, it is obvious that the best channel error estimate can be acquired by using as many bits as possible from the receiving signal(s) during the error estimation. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to utilize as many bits as possible in the receiving signal for the estimation of the channel error as taught by LaRosa et al in the TDMA receiver method of Love et al in view of Birchler et al because the channel error estimate would be as accurate as possible. The applicant's explanation of the use of a "half timeslot" worth of bits in the channel error estimate on page 2, line 22 is made as "for example", and does not imply any particular novelty with the exact number (a half timeslot worth) of bits. It would have been obvious for one of ordinary skill in the art to use more bits from a TDMA frame for the channel error estimate than those only found in the synchronization word. For example, it would be obvious to one of ordinary skill in the art to use any number of bits between only the number of bits in the sync word to the total number of bits in the TDMA frame, including half the bits, as only limited by the cost and complexity of the receiver system.

Regarding claim 3, Love et al in view of Birchler et al and in further view of LaRosa disclose the limitations of claim 2 as applied above. Further, Love et al discloses the method further comprising using a signal path error metric which is generated by means of quadratic errors which are calculated on the basis of the difference between individual symbol sequence specific sample points and

corresponding reference constellation points constructed on the basis of the channel estimate describing the state of the radio channel used as the error estimate representing the erroneousness of the signal path. An adaptive MLSE receiver makes a symbol decision based upon the quadratic errors between the signal path and the estimated channel error signal path (col. 3, lines 46-65). One skilled in the art is familiar with how an MLSE receiver works to make symbol decisions for quaternary phase shift keyed (QPSK) modulated signals. The channel error estimate is composed of a reference constellation of points (col. 3, line 66 – col. 4, line 5). As is understood by one of ordinary skill in the art, the channel error estimate comprises a type of weighted average by using the received complex signal values for tracking and describing the state of the radio channel.

Regarding claim 4, Love et al in view of Birchler et al and in further view of LaRosa disclose the limitations of claim 2 as applied above. Further, Love et al discloses the method further comprising generating two or more alternative signal paths (fig. 5, refs. 44, 45; col. 2, lines 10-15) from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), determining an error estimate of each signal path, and selecting the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Regarding claim 7, Love et al in view of Birchler et al disclose and in further view of LaRosa disclose the limitations of claim 6 as applied above. Further, Love et al disclose the equipment wherein a signal path error metric which is generated by means of quadratic errors which are calculated on the basis of the difference between

individual symbol sequence specific sample points and corresponding reference constellation points constructed on the basis of the channel estimate describing the state of the radio channel is used as the error estimate representing the erroneousness of the signal path. An adaptive MLSE receiver makes a symbol decision based upon the quadratic errors between the signal path and the estimated channel error signal path (col. 3, lines 46-65). One skilled in the art is familiar with how an MLSE receiver works to make symbol decisions for quaternary phase shift keyed (QPSK) modulated signals. The channel error estimate is composed of a reference constellation of points (col. 3, line 66 – col. 4, line 5). As is understood by one of ordinary skill in the art, the channel error estimate comprises a type of weighted average by using the received complex signal values for tracking and describing the state of the radio channel.

Regarding claim 8, Love et al in view of Birchler et al disclose and in further view of LaRosa disclose the limitations of claim 6 as applied above. Further, Love et al discloses equipment comprising two or more parallel modulation detectors (fig. 5, refs. 44, 45; col. 2, lines 10-15) of different types for generating two or more alternative signal paths from the received timeslot or a portion thereof by two or more parallel modulation detectors preferably of different types (col. 2, lines 10-15), the equipment being arranged to determine an error estimate of each signal path and to select the signal path having the best error estimate to be used in the comparison (col. 5, lines 38-43).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (703) 305-0374. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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